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Agricultural Experiment Station, Storrs, Connecticut.

A HYBRID DEER OF THE F₂ GENERATION

BY HARTLEY H. T. JACKSON

[Plate 8]

INTRODUCTION

Among deer hunters who search for their spoils on the eastern slopes of the Cascade Mountains in the state of Washington, it is quite generally known that in a certain region the mule deer (*Odocoileus hemionus hemionus*) and the Columbian black-tailed deer (*Odocoileus columbianus columbianus*) hybridize. This area is where the western range of the mule deer and the eastern range of the black-tail overlap. It may be roughly outlined by the summit of the Cascade Mountains on the west; the region of Stampede (or Yakima) Pass and lakes Keeches and Keechelus on the north; a line drawn north and south through a point 6 miles east of Signal Peak, the Tieton Basin, and Frost Mountain on the east; and Mount Adams on the south. Mr. James Henderson writes:

This cross breeding of the mule deer and the Columbia black-tailed deer is not common. . . . The different varieties of deer have their respective ranges very well defined, the mule deer seldom going to the summit of the divide and never, to my knowledge, beyond on the west slope. They are very much more scarce than the black-tails near the summit. I believe the lack of mates of their own kind leads the bucks of this variety to cross with the does of the black-tailed kind. Their offspring will then mate with either. (Letter to the U. S. Biological Survey from James Henderson, Mabton, Washington, April 24, 1917.)

Very few of these hybrids have found their way into mammal collections and, their direct lineage being unknown, any of them collected in their native habitat would have little, if any, scientific value, in so far as studies in heredity are concerned. In March, 1917, the United States Biological Survey received a hybrid deer from Mr. A. S. Horner, North Yakima, Washington, which had been raised in captivity by Mr. James Henderson. This specimen, a tanned skin accompanied by imperfect skull, is now numbered 223,685, United States National Museum, Biological Survey Collection. In regard to this animal Mr. Henderson writes:

This deer was killed in January, 1915, and would have been 4 years old the following May. It was rather a tall rangy deer of good proportions and fairly large bones. It was born and raised in my enclosure and was killed on account of becoming so vicious as to be very dangerous. I procured his grandsire from Ellensburg, Washington, on the east slope of the Cascade Mountains. He was a fine specimen of mule deer, full blood. The granddame was secured near South Bend on Willapa Harbor on the coast of this state. She was a full blood Columbia black-tail. These two deer mated and produced a pair of female fawns. About the same time I procured a full blood mule doe from the same man who furnished me the mule buck, Mr. Chris Gray, of Ellensburg, Washington, now deceased. This doe was with fawn to a full blood Columbia black-tail buck owned by Mr. Gray. This mule doe gave birth to a pair of male fawns after she came into my possession and at about the same time as the other pair was born. I selected a female from one pair and a male from the other pair of fawns and raised them until they bred and raised the deer of which you now have the skin and head.

. . . . There are quite a few [hybrids] on the east slope of the Cascade Mountains, where a few full blood mule deer live, going down on the east side in winter, while the Columbia black-tail go down the west slope to winter. Owing to the small numbers of mule deer they sometimes cross breed in their wild state and readily cross in domestication when dependent on man for existence. (Letter to U. S. Biological Survey from James Henderson, Mabton, Washington, March 29, 1917.)

COMPARISON OF THE HYBRID WITH ITS PARENT SPECIES

The ancestry of this animal (H^2) is represented graphically in figure 1. Unfortunately none of the parents or grandparents of the specimen is available and all that can be attempted in the present paper is to compare it briefly with each of its parent species. The mule deer differs in external characteristics from the black-tail in that it is a larger animal; the ears are relatively longer, and larger in general; the hair on all surfaces of the tail for the proximal $\frac{2}{3}$ to $\frac{3}{4}$ of its length is white or whitish, whereas in the black-tail the upper surface of the tail is covered

with black or blackish hairs the entire length; the metatarsal gland is longer in the mule deer; the antlers are larger in all proportions, with the primary divisions of the beam forking at a lesser angle, the anterior fork extending more nearly vertically to the plane of the occiput (less forward and inward). Cranially the mule deer differs from the black-tail in that the post-frontal region arises distinctly

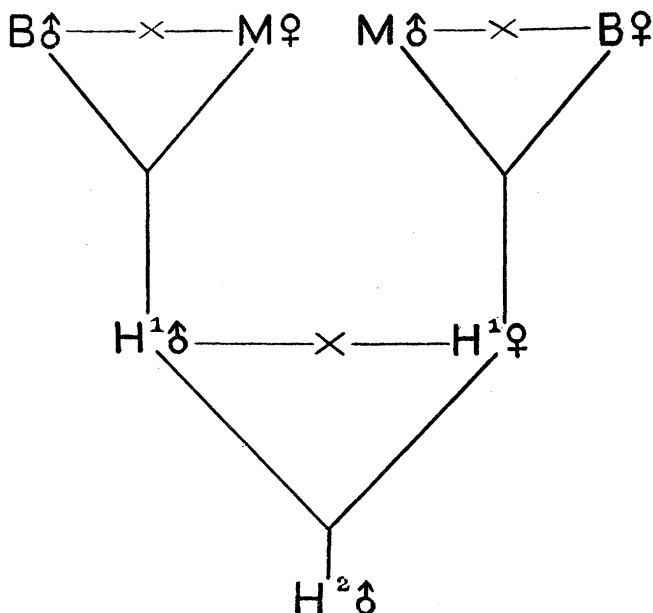
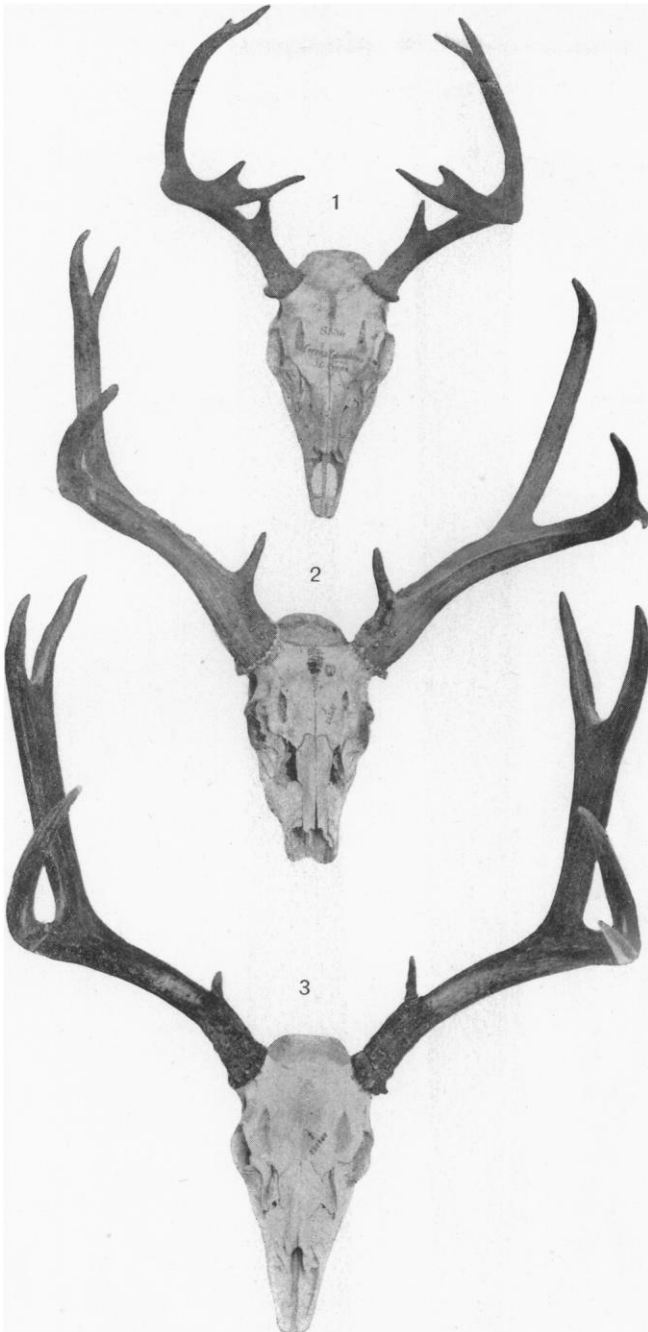


FIG. 1. DIAGRAMMATIC REPRESENTATION OF ANCESTRY OF SPECIMEN NUMBER 223,685, U. S. NATIONAL MUSEUM, BIOLOGICAL SURVEY COLLECTION

B, Columbian black-tailed deer; *M*, mule deer; *H*¹, hybrid from first cross; *H*² (specimen 223,685), hybrid from second cross; ♂, male; ♀, female; X, crossed with.

higher and more abruptly, producing in effect a more depressed interorbital region, whereas in the black-tail the superior aspect of the skull is comparatively flattened. There are other *average* differences between the two species, but in fully adult animals of comparable age the two forms seem to be sharply differentiated in each of the above characters, there being no overlapping, nor intermediates, in the numerous specimens examined.



SKULLS OF DEER

FIG. 1. *Odocoileus columbianus columbianus*. Number 8154, U. S. Nat. Mus. Puget Sound, Washington.

FIG. 2. *Odocoileus columbianus columbianus* \times *Odocoileus hemionus hemionus*. Number 223,685, U. S. Nat. Mus., Biological Survey Coll. Mabton, Washington.

FIG. 3. *Odocoileus hemionus hemionus*. Number 230,960, U. S. Nat. Mus., Biological Survey Coll. Winthrop, Washington.

The hybrid specimen is not strictly intermediate in characters between *hemionus* and *columbianus*. In some characters it is indistinguishable from *hemionus*, in another like typical *columbianus*, and in one respect it appears to be intermediate. On the whole it is more like *hemionus* than like *columbianus*. The hybrid was a large deer and, in size, would pass for a rather large *hemionus*. It also has the large ears characteristic of the mule deer. The metatarsal gland on the left leg measures, in the tanned skin, 125 mm., that on the right leg 119 mm., in every respect typical glands of full blood *hemionus*. The antlers also are indistinguishable from those of the mule deer. They are not as long as some mule deer antlers, but have as heavy beams as any I have examined, and branch in a fairly normal mule-deer fashion. The tail, however, is distinctly and unmistakably like that of a black-tailed deer. The post-frontal region of the skull appears to be intermediate between that of a black-tailed deer and that of a mule deer, but probably is nearer that of the black-tail. Viewed in life then, this animal undoubtedly had the appearance of a mule deer with a black-tailed deer's tail.

CONCLUSIONS

It is to be admitted that from a geneticist's point of view this paper is not entirely satisfactory and that a more serious study of the specimen might bring out many additional facts. However, three points are worthy of notice. Regardless of variance of opinions as to the definitions of a species and a subspecies, so far as I am aware it has been conceded by all mammalogists that the mule deer and the black-tailed deer are distinct species. The first point, then, is that within a certain area in the state of Washington *two distinct species*, the mule deer and the black-tailed deer, *interbreed in their native habitat*. Second, *the hybrids of the first filial generation produced by the crossing of these two distinct species are fertile to each other*. Third, it is strongly suggested that *in these crosses certain unit characters are transmitted to the offspring*. The hybrid studied was essentially a mule deer in several characters, black-tailed deer in at least one character, and showed a possible tendency to be intermediate in one. Whether these characters are transmitted in Mendelian ratio is, of course, impossible to determine with the material at hand.